



Clinical validation of the NANDA-I diagnosis of impaired memory in elderly patients



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ABSTRACT

Purpose: The aim of this study was to perform a clinical validation of the defining characteristics of impaired memory (IM) in elderly patients at a long-term care institution.

Methods: A sample of 123 elderly patients was evaluated with a questionnaire designed to identify IM according to the NANDA-I taxonomy. Accuracy measures were calculated for the total sample and for males and females separately.

Results: Sensitivity and specificity values indicated that: (1) inability to learn new skills is useful in screening IM, and (2) forgets to perform a behavior at a scheduled time, forgetfulness, inability to learn new information, inability to recall events, and inability to recall factual information are confirmatory indicators.

Conclusion: Specific factors can affect the manifestation of IM by elderly patients. The results may be useful in improving diagnostic accuracy and efficiency of the IM nursing diagnosis.

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1. Introduction

Aging is a dynamic and progressive process characterized by morphological, functional, biochemical and psychological changes that can determine the loss of an individual's ability to adapt to his or her environment (Wold, 2011). One of the largest health adversities related to aging is cognitive impairment (including impairments in episodic memory), which causes restriction or loss of skills needed to perform functions and activities of daily living (Drag & Bieliauskas, 2010). Thus, among numerous specific indicators, the presence of physical and cognitive deficits determines the health status of the elderly.

The decline of intelligence, learning ability, and memory represents important cognitive deficits associated with aging (Eliopoulos, 2014). Memory is the most widely studied cognitive ability, and the decline of this function is a major concern for elderly people (Barcelos-Ferreira & Bottino, 2014). Additionally, this function is essential for the storage of information, the knowledge of self and the world, the development of language, the recognition of people, and the consciousness of the continuity of life itself (Volkers & Scherder, 2014).

Nurses may have a critical eye for individuals who are experiencing specific negative medical effects during the aging process, and can

acquire the necessary skills to carry out an effective plan of care that contributes to the promotion of quality of life. Impaired memory is a nursing diagnosis from the NANDA-I taxonomy II that is embedded in the Perception/Cognition domain. This diagnosis is defined as the inability to remember or recall information or behavioral skills, and it includes a set of ten defining characteristics: forgets to perform a behavior at a scheduled time, inability to learn new information, inability to learn new skills, inability to perform a previously learned skill, inability to recall events, inability to recall factual information, inability to recall if a behavior was performed, inability to retain new information, inability to retain new skills, and forgetfulness (Herdman & Kamitsuru, 2014).

There are few studies on the nursing diagnosis of impaired memory, and this gap is even greater in the case of studies focused on the investigation of defining characteristics of nursing diagnoses. Impaired memory has been reported in prevalence studies and, in most cases, is listed together with other nursing diagnoses (Brusamarello, Capistrano, Oliveira, Mercês, & Maftum, 2013; Frauenfelder, Müller-Staub, Needham, & Achterberg, 2011; Güler et al., 2012). Although exploratory approaches are necessary, they do not allow for analysis of the relationship between a given nursing diagnosis and its defining characteristics, which are essential for understanding how the diagnostic process is carried out in specific situations or populations.

Chaves, Barros, and Marini (2010) developed a content validation of the impaired memory components from the NANDA-I taxonomy II with a panel of experts. However, the authors did not perform a clinical validation of this nursing diagnosis, and suggested it for further studies. In an exploratory study, Souza and Santana (2011) proposed the clinical

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validation of a protocol that was specifically designed for the identification of impaired memory, but the study was intended for hospitalized patients with a diagnosis of dementia and was focused on the prevalence of the defining characteristics with no investigation of the occurrence of relationships between the variables.

There are difficulties in establishing clinical criteria that favor the accurate identification of impaired memory. In general, nurses use vague and inconsistent criteria in clinical practice to identify the presence of cognitive deficits (Carpenito, 2012; Elliott, Horgas, & Marsiske, 2008). Thus, it is not certain that two nurses assessing the same nursing diagnosis are talking about the same thing, because the diagnostic assessment is made based on personal, instead of standardized, criteria. As a result, there is confusion in the diagnostic process involving impaired memory and other nursing phenomena (Ried & Dassen, 2000).

Difficulties in the nursing diagnostic process have stimulated the development and dissemination of accuracy and clinical validation studies, which have become important research approaches. The accuracy determines the direct relationship between a defining characteristic and the presence or absence of a given nursing diagnosis. In other words, the accuracy measurements allow for the establishment of clinical indicators that are appropriate in the inference of certain diagnoses, which contributes to improved clinical reasoning, the delimitation of the nursing skills, and consolidated evidence-based clinical practice (Lopes, Silva, & Araujo, 2012).

Clinical validation studies are needed not only to increase the validity of the diagnoses that belong to a particular taxonomy, but also to provide tools to more accurately assess the health status of patients. The primary aim of this study was to conduct a clinical validation for the defining characteristics of impaired memory in elderly residents of a long-term care institution. As a secondary aim, we examined the presence of relationships between demographic variables and the accuracy values of the defining characteristics identified in the sample.

2. Material and methods

2.1. Design and sample

This cross-sectional study was conducted in a long-term care facility for elderly persons, which specializes in the care and treatment of people with partial or total dependence, and is situated in northeast Brazil. The sample size was obtained using the following formula: $n = Z\alpha^2 \times Se \times (1-Se)/L^2 \times P$, where “ $Z\alpha$ ” refers to the 95% confidence level, “ Se ” represents an expected sensitivity of 80%, “ L ” is the half-width of a 95% confidence interval for conjectured sensitivity of 10%, and “ P ” is the prevalence for impaired memory of 50%, which is the recommended percentage when the prevalence of an event is unknown.

A convenience sample of 123 participants was recruited from the long-term care institution from a total of 222 patients. Participants had to be at least 60 years old to be included in the study. Exclusion criteria included the presence of verbal or cognitive deficits, and/or cognitive bewilderment that could prevent interaction with the subjects or lead to data collection errors. To find subjects who fit the profile, a nurse working at the institution was consulted during the recruitment period and asked about potential subjects' participation in the study. This nurse was also consulted after data collection to validate the subjects' responses. We used this recruitment strategy because this nurse had worked at the institution for years and knew each subject well.

Written consent was obtained from each participant after the purpose, nature, and potential complications of the study were explained. No incentives were given to the subjects. Ethical approval was obtained from the institutional review board.

2.2. Data collection

The data collection form included demographic data (gender, age, family income, education, and length of stay) and questions related to

the defining characteristics of impaired memory according to the NANDA-I taxonomy II (Herdman & Kamitsuru, 2014). Previous studies have found cognitive deficit, including memory impairment, among elderly with an income of \leq \$5000 and projections suggest an increasing proportion of cognitive problems and dementia in less developed countries (Berkman et al., 1993; National Institute on Aging & National Institutes of Health, 2011). Furthermore, cross-sectional and longitudinal results showed that, in less educated elderly, memory decline is faster and sets in at an earlier age (Berkman et al., 1993; Schmand et al., 1997). In addition, another study found that differences in lengths of stay were statistically significant after adjusting for age, race, and gender for elderly with cognitive impairment (Lyketsos, Sheppard, & Rabins, 2000).

Five trained nurses collected the data independently and individually through guided interviews. Inter-rater reliability was not measured; however, the principal investigator supervised the nurses' data collection with the first 20 subjects to ensure that they were using the same procedures. It is worth mentioning that the nurses were responsible only for the memory assessment; the presence of the nursing diagnosis impaired memory was estimated by the latent class analysis (LCA) method, which is described further (see the data analysis section).

All nurses were trained and instructed to use a standard operating procedure form with operational definitions and a description of how to assess each defining characteristic. The training lasted 3 hours and included the definition of impaired memory and its components, the physiological and psychosocial aspects of this nursing diagnosis, and the context of the study population. The operational definitions were adapted from a study that validated a protocol for the identification of impaired memory in hospitalized elderly (Souza & Santana, 2011).

Specific standard operating procedures were developed to guide the assessment of each defining characteristic. The memory assessment was composed mostly by questions directly asked to the patients, such as whether they perform daily activities at a scheduled time and if they remember the full name of their children or parents. All the patient's answers were validated by a nurse, who was also asked about some questions (e.g. if the patient has forgotten specific events or previously performed actions). The assessment also involved the evaluation of the ability to learn and retain skills/information by teaching the patient how to unlock the screen of a mobile phone, teaching the name of unknown objects, and applying the clock draw test.

A pre-test was performed with five subjects who were recruited using the same selection criterion and no changes were made in the collection form after that. This pre-test was also used to verify whether the team members were able to perform a standardized data collection.

2.3. Data analysis

Data analysis was performed using the R software package version 3.0.2 (R Core Team, 2014). Descriptive statistics including percentage, mean, and standard deviations were obtained. The Jarque–Bera test was applied to verify the normality of the data. The Mann–Whitney test was applied to verify differences of age/schooling level and the presence/absence of defining characteristics. The association between gender and defining characteristics was evaluated using the chi squared test with Yates' correction. The Yates correction is an adjustment made to account for the fact that Pearson's chi-square test is biased upwards for a 2×2 contingency table. This correction is usually recommended if the expected cell frequencies are below 5.

The accuracy analysis was based on sensitivity and specificity measures of each defining characteristic of impaired memory. The LCA method was applied to calculate the accuracy measures and to estimate the presence of impaired memory in the sample. This method is employed when no perfect reference standard is present (Qu, Tan, & Kutner, 1996), and it is based on the assumption that an unobserved or latent variable (nursing diagnosis) determines the associations between observable variables (defining characteristics). A two latent

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